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Teacher Professional Growth in an Authentic Learning Environment

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Abstract

Increments in educational budgets have been devoted to professional development for teachers to help them accommodate their practices to the realities of their classrooms. Previous research has suggested that despite this significant investment, there has been little, if any, positive change. This begs the question of what else might be done to reverse this outcome and contribute to transformational change of the profession. This article reports on a study that closely followed and documented the journeys of professional growth for a group of teachers from their points of view, over a period of six months. Action research was conducted in conjunction with participation in a project centred on the creation of Web sites as culminating performance tasks. Analysis of the data collected led to the conclusion that one possibility could be to facilitate professional development in such a way that it is authentic, based in the classroom and focused on tasks meaningful to and specifically chosen by the teacher. (Keywords: authentic professional development, technology, professional growth, teacher as learner.)

The process of learning to teach is complex and occurs over a professional lifetime (Beynon, Geddis, & Onslow, 2001). The research suggests that new teachers begin at individual points along a continuum of knowledge, competency, and skill and they further develop these skills during their years of classroom practice. Over time, teachers acquire both experience and expertise (Berliner, 1987). They continuously learn new strategies, which they add to their repertoire of classroom behaviours. Sometimes they make substantial pedagogical adaptations as a result and sometimes they do not.

It is the fact that some teachers make few changes over time that concerns researchers (Hargreaves & Fullan, 1992). Hargreaves (1992) partially explained this by suggesting that the quality and flexibility of teachers' classroom work is closely tied with the course of his or her professional growth, the way he or she develops as a person and as a professional. Little (1993) suggested that one reason professional growth for teachers is problematic is because of the immediacy of the classroom. Specifically, day-to-day events make it exceptionally difficult for progress to be made by the teacher towards his or her own learning goals. This immediacy of the classroom environment and the demands this puts upon any teacher's time does not sufficiently account for the gap in expertise between the teacher who makes considerable changes and the teacher who does not (Sykes, 1999).

Professional development activities designed to enrich and further enhance the professional growth of teachers have, in the past, been scheduled by administrators to work around the classroom timetables and needs of teachers (Guskey, 2000; Guskey & Huberman, 1995). However, short and intermittent

periods of inservice that rely on teachers to go back to their classrooms, and, in isolation, to implement that with which they have been presented during their professional development activities have yielded few positive results (Darling-Hammond, 1997). In a 1996 longitudinal study of the teaching profession, Darling-Hammond revealed the poor quality of teacher preparation and professional development in general. Fullan, Hill, and Crevola (2006) further document the lack of change in the teaching profession despite repeated attempts at reform.

Current teacher development theories put the teacher as learner at their centre (Ball & Cohen, 1999; Hawley & Valli, 1999; Little, 1993). Guskey (2000) expanded on this theoretical assumption by suggesting that professional development be seen as an intentional process. It needs to be purposeful and linked to the classroom teachers' needs and practices, not as someone else defines it but as they themselves perceive those needs to be. It needs also to be ongoing and, most importantly, viewed as part of what Hargreaves (1992) called professional growth, which should last one's entire career. Professional development in this view is expected to lead to sustained change in teacher classroom behaviours. Jacobson and Battaglia (2001) suggested that only when there is sustained change will professional development be transformational in terms of teacher practice and pedagogy. They further posit that this measure of success depends upon the teacher being part of the process of setting identifiable goals and working towards them. This begs the question of how professional development for teachers must be structured and executed to ensure that it becomes transformational for those teachers so that it leads to changes in both pedagogy and practice.

Mezirow (1985) has suggested that there are three kinds of adult learning—instrumental (e.g., specific skill development), dialogic (e.g., learning together in search of understanding), and self-reflective (e.g., through self-reflection finding understanding which then leads to change in performance). Staff development efforts in the past focused primarily on the first two kinds of learning. Teachers went to workshops for a few hours or a few days to learn something specific that had been determined by others that it was important to know or to be able to do (McBride, 1989). The teaching and learning model used for these events was the transmission of knowledge or skills, which was the same approach most frequently being employed in the classroom (Bransford, Brown, & Cocking, 1999). However, there is now a growing awareness that for meaningful change to occur, the emphasis must be on the third kind of adult learning. Teachers must be provided with experiences that encourage and depend upon self-reflection and are part of a continuous process directed toward professional growth (Lieberman & Miller, 2001; McLaughlin & Oberman, 1996). Such experiences might begin with a stimulus to learning directed towards pedagogy, content knowledge, or classroom practice. It would continue with opportunities to implement and practice that which was recently taught. Then there would be the expectation that the learner, in this case the teacher, would reflect upon the process. New knowledge of what works best in the classroom would be acquired in this manner. Current learning theory emphasizing the role of scaffolding of new learning would suggest that these opportunities would be more likely

to lead to change when it fits into already existing schema on the part of the teacher as learner (Brooks & Brooks, 1993).

Learning occurs best in context or in experience, in real-life environments, through constructivist knowledge creation processes (Kolb, 1984). Harris and Grandgenett (2002), as well as Dickenson, McBride, Lamb-Milligan, and Nichols (2003), in looking at various school-based initiatives focused on teachers, dubbed this process "authentic" professional development. In the case of the classroom teacher, this means his or her classroom is the focus of the new learning. Others have referred to such learning in a variety of different ways. Whether it is called "experiential" or "situational" (Kolb, 1984), "guided discovery" (Brown & Campione, 1994), "workplace learning" (Retallick, 1999), "learning along the way" (Sweeney, 2003), or "authentic" (Harris & Grandgenett, 2002), the essential components are the same.

Harris and Grandgenett (2002) used the term authentic to describe the learning occurring by classroom teachers when they participated in collaborative Internet activities with their students. Learning about the Internet was something new for teachers, yet they were allowing their students to participate in projects only available online. Harris and Grandgenett, in turn, borrowed the term from Donovan, Bransford, and Pellegrino (1999), who suggested that "authentic learning allows students to engage in learning and meaningfully construct concepts and relationships in contexts that involve real-world problems that are relevant and interesting to the learner" (p. 1).

RESEARCH QUESTIONS

In this study, teachers were asked to tell about their journeys of professional growth in an authentic learning environment, which was the result of their participation in a particular technology oriented project. The data collected documented the professional development of these teacher participants as their students worked to complete various learning tasks in conjunction with participation in a special project called GrassRoots. GrassRoots was a program organized by SchoolNet, a semi-autonomous governmental agency fully funded by the Canadian federal parliament. SchoolNet began to fulfill the mandate of government policy to ensure that every school in Canada had an Internet access point (Kitagawa, 2001). GrassRoots was designed to motivate schools to learn how to use that Internet access point in the service of student growth. The idea was to reward classrooms that created Web pages as culminating performance tasks to display new learning on whatever subject area the teacher deemed appropriate at that time. Students would do research on any topic and rather than submit traditional project reports or display boards or build models, Web pages would be created displaying that "web" of information. These would be linked thematically by the students themselves into a greater whole, creating a Web site on that topic with links among and between the pages wherever relevant.

While the focus of the GrassRoots projects was student-created Web pages, their teachers had to learn the skills first in order to properly guide their classes. Not only did they have to learn the technological skills, they also had to come to understand the pedagogy involved in using Web sites as culminating perfor-

mance tasks. Despite this multiplicity of skills needed to be acquired and the complexity of the final task, teachers volunteered and willingly undertook their journeys of authentic professional development. Their participation and the work in which they engaged their students was supported by this researcher in conjunction with his role as a curriculum consultant in the area of technology integration in classroom teaching. Looking at their journeys, individually and collectively, answers to the following questions were sought through an analysis of a variety of data sources:

1. Why did they embark on a path of significant professional growth? Why did they take up the learner's challenge?
2. What capacities or abilities did they (as learners/teachers) bring along with them on their journey?
3. What conditions were in place that facilitated or detracted from their journeys?
4. What did they see as the outcomes of these journeys for themselves and for their students?
5. What did these teachers see as their next steps?

Agreeing to participate in this project opened up a door to a considerable amount of "authentic" professional development (Harris & Grandgenett, 2002; Means & Olsen, 1994) for most of the teacher participants. Their desire to participate in the project derived specifically from a desire to learn how to create curriculum based Web pages and was not predicated upon any presumed level of competency in these technological skills. In fact, most frequently, teachers knew that, from beginning to end, they would be on a very steep learning curve. In addition, all new learning by teachers, of necessity, happened while they were working with their students in their classrooms. They had to apply to GrassRoots to participate and that application process was rigorous, demanding, time consuming, and entirely online. They had to indicate, in advance, what subject areas their classroom project would address and each project had to address at least two. They had to outline how students would show leadership in learning not just the academic goals but as well the technical skills that would be required to complete their work. They had to work with their students to complete the sometimes very complicated Web sites they had created. They had to see this process to a successful conclusion and then report on their finished products to GrassRoots afterwards. Authentic professional development for these teachers began with learning about problem-based learning and continued with how to use software to create Web pages and finished with how to make their student-created Web sites go live on the Internet.

Involvement in GrassRoots by classroom teachers was part of the job for this author as a consultant for a mid-sized district school board in southern Ontario, Canada. This was action research because I functioned in the role of the facilitator of the projects and the professional developer working with the participants. The role of facilitator was to act as the guide on the side for the classroom teachers, monitoring and supporting each step and to become involved only when he or she felt support was needed or specific skills needed to be learned.

Support and coaching, depending upon the participant's need, might have included:

- Visiting schools and helping teachers develop a vision, define the subject areas, narrow down the curriculum expectations being addressed, and determine how complicated from a technological perspective they were prepared to allow the work to become, and then
- helping the teachers complete the online application and proofing and accepting on behalf of GrassRoots each project individually, ensuring compliance with the very tight guidelines provided by the GrassRoots directors.
- facilitating in-services on the fundamentals of Web page design,
- visiting schools to help teachers who needed more than a few hours of intensive instruction at the various phases of the project,
- answering the many e-mail and phone messages concerning the specifics of the projects as they unfolded in the schools,
- facilitating access to whatever hardware or software resources might be required by these teachers as they worked through their projects,
- working in classrooms engaged in completion of their web designs as an assistant to the classroom teacher,
- helping each teacher take their completed projects and post them online, and lastly,
- ensuring that each project was completed in a timely fashion and met the specifics of the original application.

In September 2003, district teachers were invited to participate in GrassRoots projects. By the end of that fall term, 37 projects had been voluntarily proposed, were accepted, and ready to be conducted. Subsequently, letters of invitation to participate as subjects in the action research were sent to the classroom teachers undertaking these projects currently or who had previously participated. They were asked to consent to the sharing of all aspects of their involvement in GrassRoots. From these invitations, 26 signed permission forms were received. Of the 26 teachers who agreed to be participants, 16 (62%) were female and 10 (39%) were male. There were eight secondary teachers (31%) and 14 elementary teachers (54%). Of the 26 participants, seven were not involved in project work at the time in which the specific data artifacts were being collected. Despite this limiting factor, it was decided to include these teachers as participants because the data they had provided during previous school visits and/or phases of GrassRoots were relevant to the questions guiding the research. Their previous journeys and the reasons for not being involved with projects at that particular time shed light on specific aspects of the pathways leading to professional growth, which was the question at the heart of the research. For example, the pressing needs of daily classroom events and the continual demands upon these teachers' class time often made reflection, record-keeping, and communication a difficult task (Calderhead, 1987). The 19 participants who were active GrassRoots teachers frequently affirmed this constraint in personal discussions during work on their GrassRoots projects.

RESEARCH DATA SOURCES

The formal GrassRoots project proposal provided some of the baseline data for the exploration of the journeys of the teacher participants. Questions that were asked in the proposal included the grades they taught, the sizes of their classrooms, their expectations in terms of what they wanted to accomplish with their students, their approach to the completion of the Web pages, and the various technologies they were planning on using. Discussions with the teachers as they completed their project proposals also became part of the exploration of the beginning of their journeys. Every interaction between consultant and teacher engaged in GrassRoots provided informal opportunities to gather information about that teacher and his or her learning journey. In addition much written data were collected in conjunction with these interactions and their facilitation. To complement the baseline data provided through the application and interview process, a short formal questionnaire was completed. The results of this questionnaire provided demographic information about the participants.

One of the expressed objectives of participation in GrassRoots is for both students and teachers to enhance their competency levels in Information and Communication Technology (ICT) skills. It has been suggested that if teachers are to enhance their use of technology in the classroom, in general, they must first perceive they are gaining in their own skill development in that same technology (Hill, Smith, & Mann, 1987; Mitra, 1998). To measure the participants' self-identified competency level, the International Society for Technology in Education's Recommended Foundational Competencies in Technology for All Teachers (International Society for Technology in Education, 2000) was used as a measurement tool. This same tool had been used previously by the author as part of a previous study and was found to be a useful way for teachers to gauge their ICT skill set at a particular moment in time (Slepkov & Kerr, 2004). (Visit the ISTE Web site www.iste.org/standards for the complete competencies checklist)

The self-defined scores of efficacy and ability relative to the use of ICT skills were used as evidence of entry-level teacher competency and as a source for the triangulation of data. Specifically, scores derived from the checklist could be compared to statements made by the participants during the project proposal phase when talking about the need for skill development in Web site creation, upon completion concerning that teacher's declared advancement in technology skills, when asked about the likelihood of continuing to participate in the GrassRoots project, and also when asked whether he or she planned to continue to use technology in classroom programming. These comments were also to be taken as evidence of the teachers' understanding of how the use of technology can contribute to the successful achievement of specific learning outcomes of their students. This is one of the goals from a professional development point of view. Mitra (1998), Becker and Ravitz (1999), Christensen (2002) and Franklin (2007) all found in various experimental situations that the need to use technology in project-related environments led to enhanced teacher growth and the likelihood that teachers would not only continue to use technology upon completion of the specific project but also broaden its use in their classrooms.

The intervention phase of the action research design followed the steps involved in the GrassRoots process outlined in the bulleted list above and lasted a minimum of six months. Throughout that process, some teachers were able to function entirely on their own. Others required intervention of one kind or another, as previously indicated. Collaboration with other individuals and facilitation not involving the consultant was encouraged but such support during the journeys of professional growth by the teachers was not documented formally, except to indicate that they occurred when teachers were asked as part of the summation of their project work. Some teachers sought help from their more computer-literate colleagues within the same school. Some were able to get considerable help from staff and students at another school. Some of the participants even recruited family members to help them complete their projects. Such engagement with other professionals not only helped to make them aware of the projects as they were unfolding but also served to encourage some of them to volunteer to participate in the project.

Upon completion of the GrassRoots project Web site, which meant publication of the materials to the Web, every teacher completed a report online for GrassRoots. This report became another piece of data used to explore the learning journeys of the research participants. The questions included project details such as numbers of students and teachers eventually involved and the specific ICT skills eventually used. They also included broader questions such as the appearance of the Web site that was created, what the students as well as their teachers learned, and future plans for GrassRoots participation by the teacher. The answers to these questions constituted another source of data for triangulation with the subjective observations concerning the same elements of the process gathered during the active interaction phase. Teachers' responses to the questions documented their new learning and so provided insight into the nature of the journeys of professional growth from the teachers' point of view. The necessity of filing a report ensured that teachers reflected on their new learning, which Schon (1986) sees as contributing to the likelihood of sustained pedagogical change.

Originally, it was intended that there be a final personal interview with each of the participants. These interviews would have involved a series of questions concerning the specific journeys of each teacher as they finished their projects in GrassRoots and reflected back on the process. However, instead an e-survey was sent to each participant. This e-survey had a combination of open-ended questions designed to allow participants to express their opinions on significant aspects of their journeys and forced-choice questions (yes/no or multiple choice). The e-survey was only one more data source used to support, validate, and triangulate the findings of the research. (See Appendix A for the complete electronic survey.)

Given the many different sources of data, analysis and synthesis became difficult. As Adey (2004) acknowledges, personal observations must be supported by other sources of data in order to verify and validate the subjective assessments made by the researcher. In order to validate and support my subjective observations, I searched each set of data for statements relating to the profes-

sional journeys of the participants, and then categorized those responses as to which of the five research questions the data were addressing. I was following a methodology similar to that defined by Corbin and Strauss (1990) as open, axial, and selective coding. As supported by Creswell (1998), this data analysis strategy suits some forms of qualitative research because it provides a procedure for developing categories of information, making the connections between those categories, creating a theoretical construct that connects the categories, and then bringing the constructs together in a set of theoretical propositions or a "story" described by the data. Once the data sets were organized and sorted according to which of the five questions responses could be applied, insight into the process of authentic professional growth led to some important discoveries of significance to anyone interested in sustained transformational change in education.

DATA ANALYSIS AND DISCUSSION

For the purposes of this article, the general impressions of the teachers' journeys through their completion of their GrassRoots projects but not their exact responses to specific pieces of data are reported. At the outset, it must be affirmed that the similarities among and between the teachers as revealed by their responses in the data analyzed are much more pronounced than any perceived differences. However, where differences were found, they will be pointed to and commented on through this section of the article.

1. *Why did they embark on a path of significant professional growth? Why did they take up the learner's challenge?*

Some of the teachers engaged in GrassRoots projects had previously worked successfully with this researcher over several years, some were new faces to him. Specifically, of the 26 subject participants, 16 of them already had established an ongoing professional relationship. Most of the teachers who became involved in project work did so then as a result of personal efforts at recruitment. Teachers participated because they were invited to participate by a colleague at a time when they were ready to take on a new challenge. The impact of these efforts at recruitment was validated by the repetition in the data that it was through these same efforts that these teachers came to be involved. This finding became the cornerstone of the belief that not just good teaching pedagogy lay at the root of transformational professional development but, as well, it was imperative that there be the infrastructure necessary to continuously invite teachers to participate in this kind of process and display their successes to others.

One of the most important findings of the research then is the importance of the role of the professional development educator as facilitator in the learning of those engaged in professional growth. All the participants were aware that they were going to be provided with opportunities to learn new things and apply them as they went along. This was an organizational aspect of the program. They knew, in advance, that there would be someone to support their work and guide their learning. This was the pedagogical element in the process. Many of their stories refer to the positive role of the facilitator. The data also point to the

desirability of an infrastructure of support, guidance, and help. The people to whom the participants looked included colleagues in their home schools and elsewhere, technicians, other family members, and the students themselves in the GrassRoots classrooms. In several instances, such student help came from other schools nearby and frequently these were secondary students helping their elementary friends. The exact combination of the influences and support provided by these players acting behind the scenes differed from participant to participant, but the benefit of that support was acknowledged by the majority of the GrassRoots participants.

Another element of commonality emerging from the responses of the participants was the connection between personal and professional goals for themselves and their students and their engagement with GrassRoots. Participants indicated that they were interested in learning new skills, which in turn would lead to providing their students with new and different learning opportunities. They were interested in using GrassRoots as a vehicle to enhance student and teacher technology skills. There was then a convergence between the seeking out of new learning by the participants and the opportunity placed before them of a vehicle to accommodate that search. These were the stimuli that engaged the participants in GrassRoots and that initiated them in taking up the journey of the learner. The teachers engaged in GrassRoots projects willingly and eagerly volunteered to participate in a process that would provide them with an opportunity to develop professionally.

Teachers are people first, however. There are and always will be teachers who resist calls for anything more than official attendance at any sort of mandated professional development activity. Hargreaves (1994) pointed out that such resistance can be a response of some teachers to a call for change of any kind. They do this, Hargreaves suggested, because professional development activities overlook the emotional component in teaching. Palmer (1998) wrote of the courage to teach and courage is an emotional response to a particular situation. Both Palmer and Hargreaves suggested that teachers will respond to the demands of their classrooms in various ways. Sylwester (2000) reminded us of the importance of the emotional component in learning. Just as students vary in their emotional needs and responses in the classroom, not all teachers will involve themselves in their profession the same way.

One thing some participants lacked, for example, was a timetable that could be accommodated easily to GrassRoots project work, or a suitable classroom assignment that enabled them to work with a class on a GrassRoots project just because they wanted to, or personal circumstances that provided opportunities for extra time to devote to professional matters. Czikszentmihalyi (1993) and Hargreaves (1998), among others, explore this element of personal time to devote to the evolution of self, and that aspect of it which is professional development. The impact of time on the freedom of any teacher to devote to long-term professional development of this kind is one of the findings of this research that is not explored sufficiently in the literature. Adey (2004), Ball and Cohen (1999), and Guskey (2000) for example, in their various analyses of current professional development practice and theory, do not refer to the question

of the time necessary for professional development as it relates to the demands, both physical and emotional, of teaching.

In looking at the motivation of these participants to embark on this journey of professional growth, it could be argued that they replicated the journeys of the heroes of Greek mythology (Brown & Moffett, 1999). They saw a challenge and accepted it. The participants were exposed to advocacy on behalf of GrassRoots and the benefits to be derived from participation in several different environments and through more than one means of communication. This personal advocacy of a professional development opportunity is not unlike the provision of a culminating performance task focusing on a big question, which lies at the heart of the design for understanding approach to teaching (Wiggins & McTighe, 1998). This approach to professional growth and learning by classroom teachers is significantly different from other currently used methods of delivery of such professional development. Rather than predetermining what the expected outcome of any individual professional development opportunity ought to be for every teacher, the topics of professional development opportunities must be sufficiently broad to enable the classroom teacher to construct knowledge and gather skills that are meaningful to him or her at that particular moment in their professional life. Each teacher has his or her own unique approach to the demands of their chosen career. This reinforces the importance of a continuous program of professional development with multiple opportunities or junctures in time for classroom teachers to re-embark on their journeys of professional growth. For example, although there were no more opportunities to participate in another GrassRoots project upon completion of this research, there was no doubt in the minds of the majority of the teachers engaged in projects that, had there been such opportunities, they would have been anxious to continue to develop their skills and they had already frequently lined up more teachers at their schools to get involved.

2. *What capacities or abilities did they (as learners/teachers) bring along with them on their journey?*

From the perspective of sound pedagogy, the researcher chose to wait for the teachers to approach him for some assistance, rather than his setting the directions for them. The fact that the GrassRoots task was open-ended enabled the learners to go off in the directions that were meaningful for them, rather than one set by another educator. Not all of the participants had all of the skills one would assume would be necessary to complete projects such as were expected with GrassRoots. Some were more versed, however, in the pedagogy as evidenced by their responses during the proposal phase of the project. This is what led these participants to Web pages as culminating performance tasks. They were interested in exploring various dimensions of problem-based learning. Some were more adept and comfortable with technology, or enamored with the technology, and wanted to learn how to apply it to the pedagogy. They acknowledged generally a lack of the highly specific skill-based knowledge of how to create the Web pages that would display their students' new learning. They only needed help in conjunction with these specific technological skills. Howev-

er, they, like the others, possessed a strong pedagogical background for why they should integrate learning and a heightened desire to make this approach work, using technology as a tool to communicate new learning by their students.

There was wide variance in the individual comfort level with computer technology, and a declared willingness to learn more skills was among the most important capacities the participants brought to their project work. This finding confirmed what the literature suggested could be expected in any heterogeneous school district (Pflaum, 2004). If a teacher was relatively illiterate about the required computer skills, that teacher welcomed the opportunity to enhance his or her expertise. If they were already skilled, they welcomed the opportunity to help their students acquire the same sets of skills. If they were more skilled or less skilled than a colleague in the same school, they were more than willing to collaborate. The link between computer efficacy and skill set were key components as they agreed to participate and face the challenge of a project and the professional learning to come. The data repeatedly affirmed that GrassRoots provided teachers and their students with the opportunity necessary to aim for mastery rather than merely performance in the acquisition of technology skills.

3. What conditions were in place that facilitated or detracted from their journeys?

The data revealed that the element of time, loosely defined, was crucial to even considering the start of their journeys. The participants had to find themselves with the right group of students, the right subject(s) to teach, and the right access to the technology they would need. What sets this group of participants apart is that it did not matter to them that they would need to put in extra personal time. A highly developed work ethic and much enthusiasm for the opportunity to participate in something new or to learn new skills counter-balanced the many extra hours needed to accomplish their identified goals. Once again, this result points to the need to attend to the infrastructure underlying professional development opportunities as well as to the pedagogy informing its particular methodology and approach to learning.

The research results point to the significance of applying the knowledge of cognition and learning to the delivery of professional development. One aspect of this is to know, as an educator, when to interact with a learner and when to leave the learner to work through his or her own learning challenges. This reinforces the concept of the professional development being authentic in nature. It also exemplifies the kinds of authentic learning tasks called for in the work of Donovan, Bransford, and Pellegrino (1999).

The GrassRoots participants brought an awareness of the fact that they would not be traveling alone on their way to the acceptance of this specific learning challenge. While they had confidence in their own abilities to accomplish their goal, requisite to that success was that they found themselves in environments where they knew support was readily available, should they need it. Most of these participants were working with at least one other colleague in their schools, as well as with a consultant. This, they reiterated time and time again, made an essential difference in their response to GrassRoots and its embedded professional development. While the support derived from colleagues

was crucial, like students in the classroom who find partners to work with on special projects, the role of the facilitator as the *guide on the side* cannot be underestimated.

4. What did they see as the outcomes of these journeys for themselves and for their students?

Atkinson and Claxton (2000) reinforce the theory that new knowledge of teaching is derived through reflection on practice in an authentic learning environment. The requirements of GrassRoots project participation afforded this requisite opportunity to reflect upon classroom teaching practices. Participants were expected to reflect on the nature of learning that occurred and then submit reports. As a result of this reflection, pedagogical change was more likely and participants repeatedly confirmed that this had, in fact, happened. Calderhead (1987) suggested that by providing opportunities to experiment with teaching and learning styles in the classroom and then encouraging reflection on practice, one encourages growth. The participants' feedback, in this study, supported the validity of that reasoning.

What occurred from the participants' points of view was authentic professional development. The teachers were engaged in their own construction of knowledge. Participating in this project allowed them to gain new procedural knowledge that they then applied to the schemata they already had in place about their ongoing practice (Bransford, Brown, & Cocking, 1999; Brooks & Brooks, 1993). In their reflections, the participants affirmed that what they accomplished through GrassRoots was a reinforcement of their already existing schemata about what classroom learning should look like. GrassRoots also allowed them to significantly enhance their technology skills in an authentic environment where support was readily available to overcome obstacles they encountered. The literature suggests that the successful coupling of this motivation to learn computer skills and develop technological capacity through authentic professional development would lead to positive outcomes (Harris & Grandgenett, 2002; Training and Development Agency for Schools, 2006). The results validated this supposition. Not one teacher expressed any degree of disappointment in the finished products created by their students and students, as well as their teachers, were very eager to share their work with their friends and family. Pride in one's work is a profound motivator in education.

The literature on constructivist knowledge creation and the cognition and learning theory that underlies it speaks to the need for learning to be sparked by open-ended challenges (Bransford et al., 1999; Brooks & Brooks, 1993). These sparks provide the learner with a place to begin and a context within which to situate his or her problem solving (Balsom, 1985). Pedagogically, focusing on the big issue in a culminating performance task (Wiggins & McTighe, 1998) was the reason these participants were interested in GrassRoots. Aside from the link to the enhancement of technology skills, the nature of the task itself as a medium to promote student learning was a major reason for beginning the learning journey. The learning by the students under the tutelage of the classroom teacher ran parallel to the learning by the teachers under the guidance and

support proffered by the central office. Bereiter and Scardamalia (1989) focused on the role of the teacher in such an intentional learning environment. These authors acknowledge that this requires a refocusing of the cognitive role of the teacher (in this research the facilitator) in the classroom. The teacher is no longer the source of all knowledge but rather the guide in the pursuit of knowledge and skill by the learner. The role of the teacher is to then help the student construct his or her own new knowledge, not determine how that knowledge might be constituted, to help with skill development as needed rather than predetermine and teach to the skills students ought to know.

The teachers in the study were learning the whole time they were engaged in their projects. However, not all of them were self-directed, all the time. Some participants needed e-mail messages, phone calls, and even several long school visits in order to accomplish what other participants accomplished almost entirely without any need of support. Mezirow (1985) suggested that this phenomenon is entirely possible and highly likely in any group of learners. There is a key juncture where the consultant or staff developer as teacher should recognize an opportunity to intervene and facilitate new learning or prompt continued work towards that end. Each participating teacher's learning needs throughout the project had to be individually met. Grow (1991) hypothesized that there is a need to match learning styles to teaching styles to facilitate growth in independence of learning. Different subjects needed help formulating their project outlines, sometimes integrating their curriculum expectations appropriately, sometimes overcoming technical problems related to the use of technology, sometimes completing all their reports on time. These were the intervals that provided the opportunity for the consultant as teacher to facilitate the needs of those learners and the needs as dictated by their tasks. If the above processes are in place, constructivist learning is much more likely to occur. It is the same dynamic as exists in a classroom with a group of young learners.

The role of facilitator and project leader as demonstrated in this research becomes analogous to that same role assumed by a classroom teacher. In both cases, the educator is attempting to encourage new learning in the minds of students using a constructivist approach to knowledge creation. What differed was the environment in which these roles were enacted. Rather than having to show students how to use various cognitive skills to deal with content to be mastered, teachers were provided with different tools so that they could accomplish their goals with technology and pedagogy. While classroom teachers have to work at creating a culture in the classroom which would support independent and individual learning by their students, by acting as the guide on the side, this researcher (acting as consultant) had to accomplish the same thing with the same participants in GrassRoots in order for their learning to occur. Rather than moving around in the classroom physically, supporting and encouraging students as they worked at various tasks, various means of communication over wider areas had to be used to accomplish the same thing. Rather than celebrating the successes of students with their classmates and parents through displays or bulletin boards or notes and phone calls home, encouragement and celebrations of success had to be built into the plan for the board as a whole. This was

accomplished by a board-wide celebration of GrassRoots participation and success by a presentation to trustees at a regularly schedule board meeting.

5. What did these teachers see as their next steps?

The literature strongly suggests that meaningful professional development needs to be looked at as a long-range goal and activity for teachers (Borko & Putnam, 1995). Only when opportunities are afforded for teachers to engage in growth over more than one or two periods or sessions, will significant learning occur. As well, reflection upon practice only becomes a useful tool to encourage sustained change if, upon reflection, new opportunities are provided for additional practice of these newly acquired skills. There was overwhelming evidence from most of the participants that further professional growth through more GrassRoots projects was in their plans, had such opportunities been provided. It cannot be denied though that the same factors limiting participation at the outset would limit the continued participation in GrassRoots. Not every teacher wanted to jump back into another project immediately but they all declared it their intention to build upon their successes.

If one views growth over a longer period of time, there is no need to focus on the one-time-only workshop or the day of seconded professional development where teachers are paid for their day and boards pay for the supply teachers needed to cover in their classrooms. There might still be a place for either or both secondment and in-class work to be part of a program of professional development, but they are seen as being discrete parts of a much longer process (Guskey & Huberman, 1995). This role of the teacher or consultant or coach does not end after one successful event, but needs to continue until mastery can be claimed by a much larger portion of the group being worked with. This then becomes the point at which change is self-sustaining.

There is another reason to build on that which had already been learned or acquired. Olson and Eaton (1987) suggested that teachers adapt only those parts of any innovation that fit into their particular classrooms and school contexts. This response by teachers is no different from students, each taking away something different from the learning activities in the classroom. This process is what is meant by the construction of knowledge. However, in a classroom, there is a curriculum guiding the continuous growth of students. Learning activities are provided to further develop skills and knowledge. Professional development activities are not guided by any such curriculum and, as has been pointed out, there is little or no emphasis on any continuum of development. However, this research has found evidence that supports the argument that there ought to be some sort of master plan with multiple opportunities to acquire skills as they become meaningful to the teacher as learner.

This means involvement with the classroom teachers engaged in professional development opportunities in their own classrooms. Support must be available in multiple modalities that include oral and written communication where necessary and classroom visitations as required. The literature developing on authentic professional development around the acquisition of technology (Harris & Grandgenett, 2002; Slepkov & Kerr, 2004) strongly suggests this meth-

odology ought to be generalized and extended to other topics considered to be important areas requiring transformational change by teachers. If authentic professional development in technology leads to successful adoption by teachers of new skill sets with reference to the computer, then it ought to be as valid an approach when the goal is enhanced literacy or numeracy, for example.

DISCUSSING A NEW STARTING POINT FOR PROFESSIONAL DEVELOPMENT

This action research began with five questions, which have been answered. The learning journeys of the GrassRoots participants have been analyzed and they revealed much about what brings teachers to embark on a course of professional growth—how they, as learners, rely upon others to support and inform their journeys, and how self-assessment and reflection can lead to successful pedagogical change that impacts on classroom practice. In turn, these findings further reinforce the viewing of the process of authentic professional development as being of great importance and significance as educators move forward to confront the need for educational change.

As a practitioner of professional development, this researcher came to realize, and the results of this research affirmed, perceptions concerning the importance of applying cognitive theory to the structure and practices of any proposed offerings. Before any teachers are relieved from their classroom duties for a day or any in-services are planned for the purposes of professional growth, the reasons for doing so must be carefully considered and the teaching strategies determined that will yield the desired learning. How will it be determined who will be engaged by the particular series of sessions? Will they be volunteers or not and if not why? How best should the new learning be acquired? What will the culminating performance task be to indicate that teachers have indeed learned what is expected of them? What classroom behaviours by their students will be indicators of success? How frequently will the sequence of sessions be offered? Who can best educate the teachers in the skills and classroom behaviours to be acquired? Does that individual have the resources necessary to be successful in the task? Is there a plan in place to ensure that the opportunity for growth is going to be extended to more than one group of individuals? Who will insure that these efforts are part of a wider vision of the change process? These are only a few of the questions that ought to be posed in order to ensure that professional development is organized for success and change.

As a researcher, gaps in the literature have been found that require further explication. Just as constructivist knowledge creation leads to the revelation in gaps of what is known and what is not known, this work has led to new questions that can be used to guide further research. For example, one of the most questionable findings is whether, given replication of the GrassRoots process as described, these participants would have reflected the changes in practice that they declared would have occurred. In tandem to that is the argument advanced earlier that there needs to be continuity in the course of professional development being offered to any specific group of teachers. If the goal of a specific program of inservice is to promote and advance sustained change, new research

ought to be conducted spanning more than one or two years to look for such change.

Currently in many jurisdictions in North America and elsewhere, much effort is being expended on developing the skills required by classroom teachers leading to the integration of technology into their classroom programming. Most of these follow a model of professional development that runs contrary to the findings of this research. Opportunities could be developed using suggestions outlined above and applied to groups of volunteer teachers to establish whether or not such a model of professional development, when replicated, in fact works and yields the desired results. Can any educational jurisdiction organize professional growth opportunities in such a way that sustained change will result? The need to be successful in such efforts is there, as suggested so frequently by the literature cited throughout this paper. Can the current state of "no change" be reversed as this research suggests it can be?

IN CONCLUSION

The success of the GrassRoots project as a medium by which teachers participating gained new skills and knowledge which they then passed on to their students makes a convincing case for the place of prominence of authentic learning practices in any long-term professional development initiative. Pedagogically, this means the application of what is known about cognition and learning to the learning of teachers. The research findings reaffirmed the fact that, given any learning opportunity, some learners will do just fine on their own while others will need more encouragement and support. Teacher capacity to learn and teacher willingness to learn are only somewhat connected. Other variables do play an important role and no two journeys are completely identical. If the path to sustained school change is through enhanced teacher ability, then a way must be found to connect our knowledge of teaching and learning to professional development.

However, even the most skilled practitioner will make little difference with his or her students if there is no attention paid to other elements in that same teaching and learning environment. The provision of sufficient opportunity to avail oneself of a specific professional development initiative, a curriculum guiding the individual elements offered by any jurisdiction rather than a collection of disparate and discrete topics, and facilitation by a well-trained, experienced, and motivating educator who will be able to work with any group of teachers until they have mastered the skills being transferred are all necessary components. One of the foundations of the vision for education anywhere is the goal of graduating lifelong learners. This same vision must be part of the process in the development of the teaching staff as well.

This then is a model of professional learning to which educators at all levels can turn as a guide in structuring professional development for teachers that might prove to be more successful and more widespread in the future. Such success might enhance the likelihood of true constructivist learning and lead to transformation of the teaching profession. The implications of this for the profession are clear. Successful teacher learning requires both pedagogy and facilita-

tion. Only then will teachers be able to realize their learning goals. This outcome will subsequently enhance their ability to continuously assess and improve their methodology of classroom instruction and their pedagogy of teaching as reflective practitioners (Schon, 1986).

Brown and Moffett (1999) saw change in terms of a hero's journey which could be represented by a continuous cycle of the acceptance of a challenge, the beginning of the journey, receiving help along the way, reaching the goal, and then embarking again. The model advanced by this research can now be used to inform and adapt this view of teacher professional learning. The difference, in my opinion, will be that the educators who embark on their journeys won't have to be heroes any more. Heroic efforts require a special kind of person and teachers are not always heroic. They are people first and foremost. But, using the model advanced as a result of this research, every teacher can be a hero when it comes to learning that which he/she needs to be successful. Such an outcome would make every stakeholder in the educational endeavour a winner.

Contributor

Dr. Slepkov is a former elementary school teacher and curriculum consultant who completed his doctorate upon retirement. As a consultant, he was involved for seven years as the primary convenor of staff development opportunities for all elementary and secondary teachers on technology and its use in classroom teaching practices in a medium-sized board in southern Ontario. Since retirement he has been involved in the delivery of sessional courses on technology and methodology to preservice candidates.

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APPENDIX A
GRASSROOTS EFFECTIVENESS SURVEY

Name. What is your name?

Grade. What grade do you teach?

School. What school are you at?

Experience. How many years of experience have you had?

- ☐ fewer than 5 years
- ☐ 5–10 years
- ☐ 11–15 years
- ☐ 16–20 years
- ☐ 21–25 years
- ☐ 26–30 years
- ☐ Over 30 years

Participation. How many times have you participated in a GrassRoots project with your students?

- ☐ this is my first time
- ☐ this is my second time
- ☐ more than twice

First Time. Have you participated in other centrally-sponsored projects before (e.g., Windows of Opportunity)?

- ☐ Yes
- ☐ No

Satisfaction. Overall, how would you describe your experience with this project?

- ☐ Very pleasurable
- ☐ Pleasurable
- ☐ Satisfactory
- ☐ Somewhat dissatisfied
- ☐ Very dissatisfied

Technological Comfort. I would say that my comfort level with Information and Communications Technologies (ICT) is

- ☐ Very comfortable

- ☐ Comfortable
- ☐ Somewhat uncomfortable
- ☐ Very uncomfortable

Web Site Ability. When I began working on this project with my students, I knew very little about how to go about creating Web sites.

- ☐ Yes
- ☐ No

Changed Teaching Practice. Please rate your agreement or disagreement with the following statements.

	Strongly Disagree				Strongly Agree
	1	2	3	4	5
1. Working on a GrassRoots project with my class has helped me to use more Information & Communications Technologies (ICT) in my teaching in general.	☐	☐	☐	☐	☐
2. My enhanced skills with technology have enabled me to be more effective in my integration of ICT.	☐	☐	☐	☐	☐
3. I am more aware of the ways in which I can teach the curriculum AND also use the technology.	☐	☐	☐	☐	☐
4. I have learned that it is okay if my students are more technologically literate than I am.	☐	☐	☐	☐	☐
5. I have enjoyed the fact that I was learning the same skills as my students were.	☐	☐	☐	☐	☐
6. The parents of my students have shown more involvement in what their children were learning and what they produced as a result.	☐	☐	☐	☐	☐
7. My principal has shown more interest in the accomplishments of my students with this technologically-driven project.	☐	☐	☐	☐	☐
8. My principal has shared the successes with the GrassRoots project with others in our school community.	☐	☐	☐	☐	☐
9. Other teachers have shown an interest in what I was doing with my students.	☐	☐	☐	☐	☐
10. Other teachers have expressed an interest in learning more.	☐	☐	☐	☐	☐

	Strongly Disagree				Strongly Agree
	1	2	3	4	5
11. Other teachers would like to collaborate with me in a future GrassRoots project.	☐	☐	☐	☐	☐
12. I enjoyed my involvement with a GrassRoots Web site project.	☐	☐	☐	☐	☐
13. I was surprised by what my students accomplished.	☐	☐	☐	☐	☐
14. I was surprised by how much I accomplished.	☐	☐	☐	☐	☐
15. I was amazed by how much I learned.	☐	☐	☐	☐	☐
16. I enjoyed this opportunity to develop my professional abilities while working in my classroom with my students	☐	☐	☐	☐	☐
17. I would have preferred to be seconded and given time away from my classroom to learn these new skills.	☐	☐	☐	☐	☐

Changed Practice. Please give a specific example of how participating in GrassRoots has caused you to change your teaching practice.

Student Involvement. Please choose appropriately in the spaces provided to indicate how much your students were involved in the following

	Totally uninvolved				Totally Involved
	1	2	3	4	5
1. Choosing topics	☐	☐	☐	☐	☐
2. Choosing partners	☐	☐	☐	☐	☐
3. Designing their pages	☐	☐	☐	☐	☐
4. Learning the tools you used	☐	☐	☐	☐	☐
5. Evaluating the work of other students	☐	☐	☐	☐	☐
6. Editing their work	☐	☐	☐	☐	☐

	Totally uninvolved				Totally Involved
	1	2	3	4	5
7. Creating the links	☐	☐	☐	☐	☐
8. Deciding when to work on their pages	☐	☐	☐	☐	☐
9. Deciding content of individual pages	☐	☐	☐	☐	☐
10. Designing the overall Web site	☐	☐	☐	☐	☐

Students Learning. Please give a specific example of how participating in GrassRoots has enhanced your students' learning.

Problems. Are there any ways in which participating in a GrassRoots project has affected your students in a negative way? Could you please explain?

Learning Teachers. Please give a specific example of how participating in GrassRoots has enhanced your own professional development.

Authentic PD. How did you go about acquiring the skills you needed in order to help your students complete this project?

Cost To Teacher. Have there been any unexpected and unwelcome outcomes as a result of your involvement in this project?

Benefit to Classroom. How is the GrassRoots program of benefit to your classroom?

Benefit to School. How is the GrassRoots program of benefit to your school?

Recruitment. How were you recruited to participate in a GrassRoots project?

Why Get Involved. What did you hope to accomplish with your students by getting involved?

Personal Reason. What did you hope to accomplish for yourself by getting involved?

Expectations. Did you have high hopes and expectations for yourself and for your students?

- ☐ Yes
- ☐ No

Good Bad Thing. Were you initially sorry you had gotten involved?

- ☐ Yes
- ☐ No

Process. Do you feel that you have been allowed to work away on your own on this project according to your own abilities.

- ☐ Yes
- ☐ No

Outside Help. Have you been assisted in any way by anyone from outside your own classroom? Please check as many choices as apply.

- ☐ No one helped me
- ☐ Students in other classrooms
- ☐ Students in other schools
- ☐ Teachers in other classrooms
- ☐ Teachers from other schools
- ☐ Board office personnel
- ☐ Parent volunteers
- ☐ Other

Staff Interest. How would you describe the attitudes of your colleagues on staff toward what you were doing?

Staff Recruitment. Have any of your colleagues on staff indicated a desire to get involved in a GrassRoots project as a result of what they have seen you working away at? Please comment.

Typical or Not. Does your staff always get involved easily and quickly in new learning initiatives or programs?

- ☐ Yes
- ☐ No

Project Participation. Are teachers in your school typically involved in board-based curriculum initiative?

- ☐ Yes
- ☐ No

Confidence. Do you feel the work on this project has helped you to feel more confident about the use of technology personally?

- ☐ Yes
- ☐ No

Self Learning. What have you learned about yourself as a teacher as a result of involvement in this process?

Future Use. Will you be more or less likely to use technology in other ways in your school program as a result of your involvement in the GrassRoots project?

- ☐ more likely
- ☐ less likely

Heading Too Long 1. Working on a GrassRoots project with your students was very much a problem-based classroom learning activity. Each student would have had to learn something very different about the topic and many times, the skills used by one student were not the same as those used by another in the creation of their Web pages. How do you feel about this type of learning?

Future PBL. In the future, will you be more or less likely to use problem-based learning like this again?

- ☐ Yes
- ☐ No

Reasons. Why did you make that choice?

Submit Survey